

IN THE CLAIMS

This listing of the claim will replace all prior versions and listings of claim in the present application.

Listing of Claims

Claim 1 (canceled).

2. (currently amended) A demodulation method according to claim 1 for reproducing data from a signal received via a signal transmission path, said demodulation method comprising the steps of:

receiving a signal including a series of frames each frame containing a training signal for automatic equalization processing and a data signal;

controlling an amplitude of the received signal by AGC processing to be a predetermined level;

demodulating said received signal processed by said AGC processing;

periodically conducting automatic equalization processing to the demodulated signal so as to adapt said demodulated signal to characteristics of said signal transmission path based on each training signal of said frame;
and

setting values of a time constant of said AGC processing and an updating repetition period of said automatic equalization processing so as to have a predetermined relation,

wherein, the time constant of said AGC processing is set so as to become longer than said updating repetition period of said automatic equalization processing.

3. (original) A demodulation method according to claim 2, wherein said time constant is so set that a change of a control gain of said AGC processing becomes 0.5 dB or less in one frame period.

4. (currently amended) A demodulation method for reproducing data from a signal received via a signal transmission path, said demodulation method comprising the steps of:

receiving a signal including a series of frames each frame containing a training signal for automatic equalization processing and a data signal;

controlling an amplitude of the received signal by AGC processing to be a predetermined level;

demodulating said received signal processed by said AGC processing;

periodically conducting automatic equalization processing to the demodulated signal so as to adapt said demodulated signal to characteristics of said signal transmission path based on each training signal of said frame;

and

setting values of a time constant of said AGC processing and an updating repetition period of said automatic equalization processing so as to have a predetermined relation according to claim 1,

wherein setting a control gain of said AGC processing is conducted in synchronism with setting timing of updating value of tap coefficients of an automatic equalizer for performing and automatic equalization processing.

5. (currently amended) A demodulation method for reproducing data from a signal received via a signal transmission path, said demodulation method comprising the steps of:

receiving a signal including a series of frames each frame containing a training signal for automatic equalization processing and a data signal;

controlling an amplitude of the received signal by AGC processing to be a predetermined level;

demodulating said received signal processed by said AGC processing;

periodically conducting automatic equalization processing to the demodulated signal so as to adapt said demodulated signal to characteristics of said signal transmission path based on each training signal of said frame;
and

setting values of a time constant of said AGC processing and an updating repetition period of said automatic equalization processing so as to have a predetermined relation~~according to claim 1,~~

wherein setting a control gain of said AGC processing is conducted every frame of the received signal.

6. (original) A demodulation method according to claim 5, wherein setting said control gain of said AGC processing is conducted at head timing of each frame of said received signal.

7. (original) A demodulation method according to claim 5, wherein setting said control gain of said AGC processing is conducted at

every frame, and the value of said control gain is made constant until a subsequent frame is received.

Claim 8 (canceled).

9. (currently amended) A demodulation method for reproducing data from a signal received via a signal transmission path, said demodulation method comprising the steps of:

receiving a signal including a series of frames each frame containing a training signal for automatic equalization processing and a data signal;

controlling an amplitude of the received signal by AGC processing to be a predetermined level;

demodulating said received signal processed by said AGC processing;

periodically conducting automatic equalization processing to the demodulated signal so as to adapt said demodulated signal to characteristics of said signal transmission path based on each training signal of said frame;

and

setting values of a time constant of said AGC processing and an updating repetition period of said automatic equalization processing so as to have a predetermined relation according to claim 4,

wherein said received signal is a transmission signal from an antenna switched at timing synchronized to said frames, on a transmission side having a plurality of transmission antennas.

10. (currently amended) A demodulation method ~~according to claim~~
4 for reproducing data from a signal received via a signal transmission path,
said demodulation method comprising the steps of:

receiving a signal including a series of frames each frame containing a
training signal for automatic equalization processing and a data signal;

controlling an amplitude of the received signal by AGC processing to
be a predetermined level;

demodulating said received signal processed by said AGC processing;

periodically conducting automatic equalization processing to the
demodulated signal so as to adapt said demodulated signal to characteristics
of said signal transmission path based on each training signal of said frame;
and

setting values of a time constant of said AGC processing and an
updating repetition period of said automatic equalization processing so as to
have a predetermined relation,

wherein said received signal is a signal modulated by using a multi-
level amplitude modulation scheme.

Claim 11 (canceled).

12. (currently amended) A demodulation apparatus for reproducing
data from a signal received via a signal transmission path, said demodulation
apparatus comprising;

a signal input section for receiving a signal including a series of frames each frame containing a training signal for automatic equalization processing and a data signal;

an AGC circuit for conducting AGC processing on an amplitude of the received signal from said signal input section to making the amplitude a predetermined level;

a demodulation circuit for conducting demodulation processing on an output signal of said AGC circuit; and

an automatic equalization circuit including a filter said automatic equalization circuit updating tap coefficients of said filter based on each training signal separated from the signal demodulated by said demodulation circuit, and conducting automatic equalization processing so as to adapt said demodulated signal to characteristics of the signal transmission path,

wherein values of a time constant of said AGC circuit and an updating repetition period of said automatic equalization circuit are set so as to have a predetermined relation according to claim 11,

wherein said AGC circuit comprises:

a variable gain amplifier for receiving and amplifying the received signal;

a power calculator for calculating power of received signal from an output of said variable gain amplifier; and

a gain setting unit for setting a gain of said variable gain amplifier, and

wherein the gain control time constant of said variable gain amplifier being set so as to become longer than said updating repetition period of said tap coefficients.

13. (original) A demodulation apparatus according to claim 12, wherein said AGC circuit is set so as to cause a change of the gain of said variable gain amplifier to become 0.5 dB or less in one frame period.

14. (currently amended) A demodulation apparatus for reproducing data from a signal received via a signal transmission path, said demodulation apparatus comprising:

a signal input section for receiving a signal including a series of frames each frame containing a training signal for automatic equalization processing and a data signal;

an AGC circuit for conducting AGC processing on an amplitude of the received signal from said signal input section to making the amplitude a predetermined level;

a demodulation circuit for conducting demodulation processing on an output signal of said AGC circuit; and

an automatic equalization circuit including a filter said automatic equalization circuit updating tap coefficients of said filter based on each training signal separated from the signal demodulated by said demodulation circuit, and conducting automatic equalization processing so as to adapt said demodulated signal to characteristics of the signal transmission path,

wherein values of a time constant of said AGC circuit and an updating repetition period of said automatic equalization circuit are set so as to have a predetermined relation according to claim 11, and

wherein said AGC circuit comprises:

a variable gain amplifier for receiving and amplifying the received signal;
a power calculator for calculating power of the received signal from an output of said variable gain amplifier;
a gain setting unit for setting a gain of said variable gain amplifier; and
means for causing the setting of the gain of said variable gain amplifier conducted by said gain setting unit to be carried out in synchronism with setting timing of updating values of the tap coefficients in said automatic equalization circuit.

15. (currently amended) A demodulation apparatus for reproducing data from a signal received via a signal transmission path, said demodulation apparatus comprising:
a signal input section for receiving a signal including a series of frames each frame containing a training signal for automatic equalization processing and a data signal;
an AGC circuit for conducting AGC processing on an amplitude of the received signal from said signal input section to making the amplitude a predetermined level;
a demodulation circuit for conducting demodulation processing on an output signal of said AGC circuit; and
an automatic equalization circuit including a filter said automatic equalization circuit updating tap coefficients of said filter based on each training signal separated from the signal demodulated by said demodulation

circuit, and conducting automatic equalization processing so as to adapt said demodulated signal to characteristics of the signal transmission path,

wherein values of a time constant of said AGC circuit and an updating repetition period of said automatic equalization circuit are set so as to have a predetermined relation according to claim 11, and

wherein said AGC circuit comprises:

a variable gain amplifier for receiving and amplifying the received signal;₁

a power calculator for calculating power of the received signal from an output of said variable gain amplifier;₁

a gain setting unit for setting a gain of said variable gain amplifier;₁ and

means for causing the setting of the gain of said variable gain amplifier conducted by said gain setting unit to be carried out every frame of said received signal.

16. (currently amended) A demodulation apparatus according to claim 15, wherein said automatic equalization circuit comprises means for generating a signal that corresponds to head timing of each frame of said received signal, and

wherein said gain setting unit conducts setting of the gain of said variable gain amplifier at timing of the signal that corresponds to head timing of each frame of said received signal.

17. (currently amended) A demodulation apparatus according to claim 15, wherein said automatic equalization circuit comprises means for

generating a signal that corresponds to head timing of each frame of the received signal, and

wherein said gain setting unit conducts setting of the gain of said variable gain amplifier every signal that corresponds to head timing of each frame of the received signal, and said gain setting unit does not update a value of said gain until a signal that corresponds to next head timing is input.

18. (currently amended) A demodulation apparatus for reproducing data from a signal received via a signal transmission path, said demodulation apparatus comprising:

a signal input section for receiving a signal including a series of frames each containing a training signal for automatic equalization processing and a data signal;

an AGC circuit for conducting AGC processing on an amplitude of the received signal from said signal input section to making the amplitude a predetermined level;

a demodulation circuit for conducting demodulation processing on an output signal of said AGC circuit; and

an automatic equalization circuit including a filter said automatic equalization circuit updating tap coefficients of said filter based on each training signal separated from the signal demodulated by said demodulation circuit, and conducting automatic equalization processing so as to adapt said demodulated signal to characteristics of the signal transmission path.

wherein values of a time constant of said AGC circuit and an updating repetition period of said automatic equalization circuit are set so as to have a predetermined relation according to claim 14, and

wherein said automatic equalization circuit comprises:

means for detecting a training signal from said received signal;

a first automatic equalizer for training signal;₁

a second automatic equalizer for data signal;₁

means for generating such correction coefficients as to make the detected training signal coincide with a predetermined reference training signal;₁ and

means for modifying the tap coefficients of said second automatic equalizer with the correction coefficients.

19. (currently amended) A demodulation apparatus for reproducing data from a signal received via a signal transmission path, said demodulation apparatus comprising:

a signal input section for receiving a signal including a series of frames each frame containing a training signal for automatic equalization processing and a data signal;

an AGC circuit for conducting AGC processing on an amplitude of the received signal from said signal input section to making the amplitude a predetermined level;

a demodulation circuit for conducting demodulation processing on an output signal of said AGC circuit; and

an automatic equalization circuit including a filter said automatic equalization circuit updating tap coefficients of said filter based on each training signal separated from the signal demodulated by said demodulation circuit, and conducting automatic equalization processing so as to adapt said demodulated signal to characteristics of the signal transmission path,

wherein values of a time constant of said AGC circuit and an updating repetition period of said automatic equalization circuit are set so as to have a predetermined relation according to claim 14, and

wherein said signal input section receives a signal transmitted from an antenna switched over at timing synchronized to the frames on a transmission side having a plurality of transmission antennas.

20. (currently amended) A demodulation apparatus for reproducing data from a signal received via a signal transmission path, said demodulation apparatus comprising:

a signal input section for receiving a signal including a series of frames each containing a training signal for automatic equalization processing and a data signal;

an AGC circuit for conducting AGC processing on an amplitude of the received signal from said signal input section to making the amplitude a predetermined level;

a demodulation circuit for conducting demodulation processing on an output signal of said AGC circuit;

an automatic equalization circuit including a filter said automatic equalization circuit updating tap coefficients of said filter based on each

training signal separated from the signal demodulated by said demodulation circuit, and conducting automatic equalization processing so as to adapt said demodulated signal to characteristics of the signal transmission path,

wherein values of a time constant of said AGC circuit and an updating repetition period of said automatic equalization circuit are set so as to have a predetermined relation according to claim 11,

further comprising an identifying unit for reproducing data from a data signal output from said automatic equalization circuit.